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EXAMINER

VERBRUGGE, KEVIN

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Paper No. 13

Application Number: 09/374,694
Filing Date: August 16, 1999
Appellant(s): DHARAP, CHANDA

Robert M. McDermott, Reg. No. 41,508
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 9/10/02.

(1) *Real Party in Interest*

A statement identifying the real party in interest is contained in the brief.

(2) *Related Appeals and Interferences*

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) *Status of Claims*

The statement of the status of the claims contained in the brief is correct.

(4) *Status of Amendments After Final*

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) *Summary of Invention*

The summary of invention contained in the brief is correct.

(6) *Issues*

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that the claims do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

Apparently the arguments are as follows:

Claims 1, 2, 7, 8, 10-14, and 17 address a general caching strategy.

Claims 3-5, 15, and 16 address techniques for determining the semantic type that is used to effect the cache assignment.

Claims 6, 9, and 18-20 address the source of the information that is being cached.

(8) Claims Appealed

A substantially correct copy of appealed claims 1-20 appears on pages 11-14 of the Appendix to the appellant's brief. The minor errors are as follows: "for controlling an automatic processing of the Web page" was omitted from the end of claim 20.

(9) Prior Art of Record

Admitted Prior Art (APA) of the specification, pages 1-4.

6,061,763

RUBIN et al.

5-2000

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1-20 are rejected under 35 U.S.C. 102(a) as being anticipated by the admitted prior art of pages 1 and 2 of the specification.

Regarding claims 1, 7, 10-15, and 20, in the paragraph bridging pages 1 and 2 of the specification, Applicant admits that it was known to receive a copy of an information resource (image or text) from a remote source (web site on the internet) and to cache the copy of the information in dependence upon a semantic type associated with the resource (whether it is an image or text). Applicant admits that it was known to treat images and text differently when he says that "a cache controller for caching information downloaded from the internet may retain downloaded image information for a longer average duration than downloaded text information."

Regarding claim 2, the known caching is at least one of the claimed types.

Regarding claims 3 and 4, in the admitted prior art system, a user requests data from an internet site as claimed, and the semantic type may be determined from the request since it is a request to reload an image or some text.

Regarding claims 5 and 16, the semantic type is based on the content of the resource (image/text).

Regarding claims 6, 9, 18, and 19, the remote source is an internet site as claimed, available via an internet service provider.

Regarding claim 8, the image/text serves as the claimed indication.

Regarding claim 17, the internet is the claimed database, comprising indexes of images and text.

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

4. Claims 1-5, 7, 8, 10, and 12-17 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,061,763 to Rubin et al., hereinafter simply Rubin.

Regarding claims 1, 7, 8, 10, and 12-17, Rubin teaches a memory management system employing multiple buffer caches. Specifically, he teaches a method of

processing an information resource comprising receiving a copy of the information resource (data object) from a remote source (storage devices storage devices 214, 216, and 218 in Fig. 4) and caching the copy of the information resource (in buffer caches 224 and 222) in dependence upon a semantic type (predefined or predetermined criteria) associated with the resource. He shows this in Fig. 4 and describes it at column 2, lines 25-56 and column 8, lines 13-64.

Regarding claim 2, Rubin's is static.

Regarding claims 3 and 4, Rubin's device determines the semantic type based on a request from the user as taught at column 2, lines 46-49.

Regarding claim 5, Rubin's semantic types are determined based on the content of the resource, as indicated in Fig. 4 (buffer cache 224 is for data about employees while buffer cache 222 is for all other data).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 6, 9, 11, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,061,763 to Rubin et al., hereinafter simply Rubin.

Regarding claims 6, 9, and 18-20, Rubin does not teach that his storage devices comprise an internet web site, however it would have been obvious to one skilled in the art to implement his storage devices on a web site since large databases such as his are commonly accessed by many users from remote locations and are commonly provided on internet sites to facilitate easy access.

Regarding claim 11, Rubin only discloses LRU and MRU as methods for determining which entries to evict from the buffer caches, however it was known to use the claimed duration limit as a method of eviction (as admitted by Applicant in the admitted prior art). It would have been obvious to the skilled artisan to evict data based on duration in the cache since that method ensures that rapidly changing data will not be resupplied erroneously to a user.

(11) *Response to Arguments*

The primary disagreement is what is meant by the term "semantic type". Since this term is not a term of the art (and Appellant admits that it is not a term of the art at page 5, third paragraph, first sentence where he states "Because semantic type is not well defined in the art...") the question arises regarding the proper interpretation of the term.

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It is well established law that where a claimed phrase is unclear, one may refer to the specification to give life and meaning to the claimed phrase. In the instant case, however, the phrase "semantic type" is not unclear. It has a very clear, if broad, meaning and we need not resort to the specification to ascertain its meaning. The clear English language meaning of "semantic type" is "data type".

But even if one does agree that the meaning of "semantic type" is unclear and goes to the specification to try to discover what is intended by the term "semantic type", one discovers that the Applicant provides many examples of semantic types, all of them being different data types as noted in the portions of pages 3, 4, 5, and 17 of the specification that are reproduced below (emphasis added):

ABSTRACT OF THE DISCLOSURE

Resources are cached based on the semantic type of the resource. The cache management strategy is customized for each semantic type, using different caching policies for different semantic types. Semantic types that can be expected to contain dynamic information, such as news and weather, employ an active caching policy wherein the resource in the cache memory is chosen for replacement based on the duration of time that the resource has been in cache memory. Conversely, semantic types that can be expected to contain static resources, such as encyclopedic information, employ a more conservative caching strategy, such as LRU (Last Recently Used) and LFU (Least Frequently Used) that is substantially independent of the time duration that the resource remains in cache memory. Additionally, some semantic types, such as communicated e-mail messages, newsgroup messages, and so on, may employ a caching policy that is a combination of multiple strategies, wherein the resource progresses from an active cache with a dynamic caching policy to a more static caches with increasing less dynamic caching policies. The relationship between semantic content type and caching policy to be associated with the type can be determined in advance, or may be determined directly by the user, or could be based, at least partly, on user-history and profiling of user-interaction with the resources.

BRIEF SUMMARY OF THE INVENTION

It is an object of this invention to provide a method and system for, among other things, controlling a cache memory to minimize access

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latency. It is a further object of this invention to provide a method and system that optimizes the allocation of cache memory.

These objects and others are achieved by providing a cache system that caches copies of resources based on the semantic type of the resource. A resource copy received from a remote source, e.g., from a server via the Internet, is categorized by its semantic type. The caching policy is customized for each semantic type, using different policies for different semantic types. The expression "semantic type" as used within this context refers to the different connotative meanings that the information contents of resources can have, as perceived by the user. For example, some information content may be perceived as highly volatile (e.g., being of short-term relevance such as web sites dedicated to the results of sport matches, to specific stock market news or currency exchange rates), other information content may be perceived as rather static (e.g., being of long-term relevance such as glossaries on the Internet). Semantic types that can be expected to contain dynamic information, such as news Web sites and weather Web sites, need a caching policy wherein the copy in the cache memory is selected for replacement based upon the duration of time that the copy has been in the cache memory. Conversely, semantic types that can be expected to relate to static resources, such as encyclopedic information, glossaries, etc., need a more conservative caching policy, such as least-recently-used (LRU) or least-frequently used (LFU), that are substantially independent of the time duration that the copy remains in the cache memory. Additionally, some semantic types, such as communicated news messages in popular newsgroups or e-mail messages in e-mail archives may employ a combination of caching policies wherein the copy of the resource, or copies of parts of the resource, are initially identified as dynamically changing, then less dynamic, then static.

The relationship between semantic content type and caching policy to be associated with the type can be determined in advance, e.g., by the resource provider, or may be determined directly by the user, or could be based, at least partly, on user-history and profiling of user interaction with the resources.

The invention also relates to a method of enabling interaction with an information resource, e.g., as supplied by a service provider on the Internet. The method comprises enabling receipt of a copy of the information from the information resource; and enabling caching the copy according to a caching strategy dependent on a semantic type of the information. The enabling of the caching comprises, for example, supplying an indication representative of the semantic type of an Internet Web site. The indication can be a meta tag that with an indication that gets interpreted at the user's client for use as a cache control parameter.

In accordance with the invention, the semantic type of the resource determines in which one of the caches 121-129 to place a specific copy of a resource that is retrieved, or downloaded, from a remote source, such as a site on the world-wide-web 180. For example, a weather report will be placed in a highly active cache 121, whereas an article from an encyclopedia will be placed in the very static cache 129. In like manner, copies of resources of other semantic types, such as news articles, stock reports, search results, e-mail messages, and so

on, will each be allocated to an appropriate one of caches 121-129,
based upon the dynamics of the semantic type.

The underlined portions indicate that semantic type is really data type, since each example of semantic type given is really a data type (news web sites, stock web sites, glossaries, encyclopedias, email messages, etc.).

Therefore, it is the Examiner's position that the term "semantic type" should be interpreted as meaning "data type" in accordance with the clear English language meaning of "semantic type" and also in accordance with the Applicant's own specification.

Furthermore, twice in the above passages, Applicant uses the term "semantic content type" further indicating that "semantic type" actually means "data type" or "content type".

In the first full paragraph of page 3 of the Appeal Brief, the Appellant quotes the specification page 3, lines 9-10 where it is stated that "The expression 'semantic type' as used within this context refers to the different connotative meanings that the information contents of resources can have, as perceived by the user." He then argues that "Of particular note is the fact that the semantic type is based on the user's perception. That is, the same information may be perceived differently by different users of the information." Then an example is provided where stock prices may be important to a stock broker and may be cached in the disclosed "active" cache, while a more casual stock observer may decide to cache the same stock price information in the "static" cache. However, this example is not supported by the specification and is

actually contradicted by the specification as indicated by the highlighted portion of the specification below:

These objects and others are achieved by providing a cache system that caches copies of resources based on the semantic type of the resource. A resource copy received from a remote source, e.g., from a server via the Internet, is categorized by its semantic type. The caching policy is customized for each semantic type, using different policies for different semantic types. The expression "semantic type" as used within this context refers to the different connotative meanings that the information contents of resources can have, as perceived by the user. For example, some information content may be perceived as highly volatile (e.g., being of short-term relevance such as web sites dedicated to the results of sport matches, to specific stock market news or currency exchange rates), other information content may be perceived as rather static (e.g., being of long-term relevance such as glossaries on the Internet). Semantic types that can be expected to contain dynamic information, such as news Web sites and weather Web sites, need a caching policy wherein the copy in the cache memory is selected for replacement based upon the duration of time that the copy has been in the cache memory. Conversely, semantic types that can be expected to relate to static resources, such as encyclopedic information, glossaries, etc., need a more conservative caching policy, such as least-recently-used (LRU) or least-frequently used (LFU), that are substantially independent of the time duration that the copy remains in the cache memory.

Nowhere is it disclosed that different users may perceive the same data differently. Rather it is disclosed that "some information content may be perceived as highly volatile" (presumably by everyone, because of the nature of the data itself) and "other information content may be perceived as rather static" (presumably by everyone, because of the nature of the data itself).

Applicant is apparently demanding that the claim language "semantic type" be given the possible values of "highly volatile", "dynamically changing", "less dynamic", and "rather static", all being possible of being assigned to any data, dependent on the user's perception or valuation of the data, independent of the data's inherent characteristics alone. This demand would force "semantic type" to equate to some

characteristic like "arbitrary volatility", since all of the cited examples of semantic type appear to have some level of volatility.

It is submitted, however, that equating "semantic type" with arbitrary volatility actually gives a meaning to the words "semantic type" that is repugnant to their ordinary meaning and contradictory to the examples in the specification and is therefore not allowed.

Applicant is entitled to be his/her own lexicographer, but may not give terms a meaning which is repugnant to its clear English language meaning. In this case, "semantic type" has a clear meaning in the English language (a group or category of things having similar meaning) and therefore no reference to the specification is necessary. Where a claimed phrase is unclear, one may refer to the specification to give life and meaning to the claimed phrase. In the instant case, however, the phrase "semantic type" is not unclear. It has a clear, if broad, meaning and we need not resort to the specification to ascertain its meaning. To give the term the very restrictive meaning asserted by Applicant would be to read disclosed, but not claimed, limitations into the claim and to give the term a meaning repugnant to the plain English language meaning.

However, even if the spec is used to define the term "semantic type", the examples provided after the definition in the spec clearly reinforce the definition as data type as explained above.

Furthermore, even if it is agreed that "semantic caching" means volatility, the rejection still applies since images and text have different volatility in the admitted prior

art (indeed, the APA caches images and text differently because of the different volatility -- text is more volatile, images are less volatile).

Regarding the 102(e) and 103(a) rejections in view of Rubin, Rubin's device groups objects of similar meaning (for instance all objects related to employment information) together in one buffer cache.

Even if semantic type is interpreted as volatility, Rubin meets the claim language since his data objects have different volatility -- different items in the database change more frequently than other items in the database. Employment information, for example, is rather static since people's employment doesn't change very often. Other information in the database is more volatile.

The Examiner is giving the claims the broadest reasonable interpretation regarding "semantic type" as dictated by MPEP 2111. The words "semantic type" broadly refer to a group or category of things having similar meaning. This is interpreted as data type, for example, where images are one data type and text is another data type. All data composing images are grouped because they have similar meaning in the sense that they all compose images. All data composing text is grouped because they have similar meaning in the sense that they all refer to text. MPEP 2111.01 instructs that words of a claim must be given their plain meaning unless the specification provides a clear definition. In this case, the definition provided by the specification is not clear ("different connotative meanings that the information contents of resources can have, as perceived by the user"). Since the examples that

immediately follow the definition in the specification are degrees of volatility, it is appropriate to apply images and text to the claim since images and text have different volatility. Finally, it is noted that the argument presented for the first time in the remarks of 6/2/02 states that data type and semantic type are two different levels of information abstraction. However nothing in the claims make the rejection based on data type inappropriate. If the Applicant intends the claims to be directed to a form of information abstraction higher than data type, it must be clearly specified in the claims.

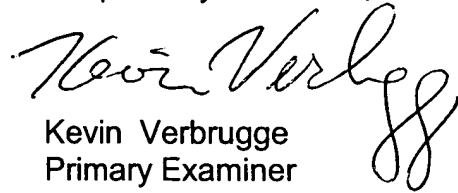
In summary, it is the Examiner's position that interpreting the term "semantic type" to mean "data type" or "content type" is entirely consistent with the English language meaning of the term and is consistent with the examples provided in the specification where different data types are listed. Furthermore, the Applicant's own use of the term "semantic content type" at two different places in the specification further supports the interpretation that semantic type is data type or content type. This interpretation makes the rejections entirely appropriate.

Applicant's attempts in the various arguments presented late in the prosecution history to equate semantic type with some sort of arbitrary volatility where different users can assign different semantic types to the same data and a separate argument that semantic type is a level of abstraction higher than data type are utterly unsupported in the specification, are not presented in the claims, and are actually contradicted by the specification as pointed out above.

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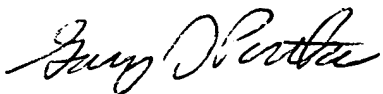
For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

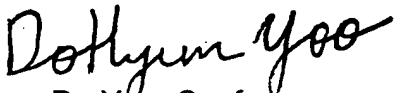


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November 21, 2002



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